

WHAT IS CLAIMED IS:

1. A semi-transmitting and semi-reflecting electrode substrate comprising:  
a transparent substrate;  
a transparent conductive layer which is disposed on said transparent substrate and contains indium oxide as its major component and further one or two or more oxides selected from tungsten oxide, molybdenum oxide and niobium oxide; and  
a metal reflecting layer which is disposed on said transparent substrate, reflects extraneous light and is connected electrically with said transparent conductive layer.
2. The semi-transmitting and semi-reflecting electrode substrate according to Claim 1, wherein the value of  $[In]/[All\ metals]$  that is a composition ratio of In in said transparent conductive layer containing indium oxide as its major component and further one or two or more oxides selected from tungsten oxide, molybdenum oxide and niobium oxide is 0.85 to 0.99.
3. The semi-transmitting and semi-reflecting electrode substrate according Claim 1 or 2, wherein said metal reflecting layer has a layer containing Al or Ag as its components.
4. A semi-transmitting and semi-reflecting electrode substrate comprising:  
a transparent substrate;  
a transparent conductive layer which is disposed on said transparent substrate and contains indium oxide as its major component and further one or two or more oxides selected from tungsten oxide, molybdenum oxide and niobium oxide;  
a TFT element disposed on said transparent substrate; and  
a metal layer which is disposed on said transparent substrate and connects said transparent conductive layer electrically with said TFT element;  
wherein:  
said metal layer has a reflectance of 80% or more.
5. The semi-transmitting and semi-reflecting electrode substrate according to Claim 4, wherein the value of  $[In]/[All\ metals]$  that is a composition ratio of In in said transparent conductive layer containing indium oxide as its major component and further one or two or more oxides selected from tungsten oxide, molybdenum oxide and niobium oxide is 0.85 to 0.99.
6. The semi-transmitting and semi-reflecting electrode substrate according to

Claim 4 or 5, wherein said metal layer having a reflectance of 80% or more has a layer containing Al or Ag as its components.

7. A method of producing the semi-transmitting and semi-reflecting electrode substrate according to any one of Claims 1 to 3, the method comprising:

a step of etching the above transparent conductive layer which contains indium oxide as its major component and further one or two or more oxides selected from tungsten oxide, molybdenum oxide and niobium oxide and is disposed on said transparent substrate, by an etchant containing oxalic acid; and

a step of etching the metal layer connected electrically with said transparent electrode layer by a mixture acid containing phosphoric acid, acetic acid and nitric acid to form said metal reflecting layer.

8. A method of producing the semi-transmitting and semi-reflecting electrode substrate according to any one of Claims 4 to 6, the method comprising:

a step of etching said transparent conductive layer which contains indium oxide as its major component and further one or two or more oxides selected from tungsten oxide, molybdenum oxide and niobium oxide and is disposed on said transparent substrate, by an etchant containing oxalic acid; and

a step of etching said metal layer which connects the said transparent conductive layer electrically with said TFT element and has a reflectance of 80% or more, by using a mixture acid containing phosphoric acid, oxalic acid and nitric acid.

9. A liquid crystal display comprising:

the semi-transmitting and semi-reflecting electrode substrate according to any one of Claims 1 to 6; and

a liquid crystal layer driven by said semi-transmitting and semi-reflecting electrode substrate.

10. A semi-transmitting and semi-reflecting electrode substrate comprising:

a transparent substrate;

a transparent conductive layer which is disposed on said transparent substrate and contains indium oxide as its major component and further one or two or more oxides selected from lanthanoid-based metal oxides; and

a metal reflecting layer which is disposed on said transparent substrate and is connected electrically with said transparent conductive layer.

11. The semi-transmitting and semi-reflecting electrode substrate according to Claim 10, wherein the value of  $[In]/[All\ metals]$  that is a composition ratio of In in said

transparent conductive layer containing indium oxide as its major component and further one or two or more oxides selected from lanthanoid-based metal oxides is 0.8 to 0.99.

12. The semi-transmitting and semi-reflecting electrode substrate according to Claim 10 or 11, wherein said metal reflecting layer has a layer containing Al or Ag as its major components.

13. The semi-transmitting and semi-reflecting electrode substrate according to any one of Claims 10 to 12, wherein said lanthanoid-based metal oxide is lanthanum oxide, cerium oxide, samarium oxide, gadolinium oxide, dysprosium oxide, erbium oxide or holmium oxide.

14. A semi-transmitting and semi-reflecting electrode substrate comprising:  
a transparent substrate;  
a transparent conductive layer which is disposed on said transparent substrate and contains indium oxide as its major component and further one or two or more oxides selected from lanthanoid-based metal oxides;  
a TFT element disposed on said transparent substrate; and  
a metal layer which is disposed on said transparent substrate and connects said transparent conductive layer electrically with said TFT element;  
wherein:  
said metal layer has a reflectance of 80% or more.

15. The semi-transmitting and semi-reflecting electrode substrate according to Claim 14, wherein the value of  $[In]/[All\ metals]$  that is a composition ratio of In in said transparent conductive layer containing indium oxide as its major component and further one or two or more oxides selected from lanthanoid-based metal oxides is 0.8 to 0.99.

16. The semi-transmitting and semi-reflecting electrode substrate according to Claim 14 or 15, wherein said metal layer having a reflectance of 80% or more has a layer containing Al or Ag as its major components.

17. The semi-transmitting and semi-reflecting electrode substrate according to any one of Claims 14 to 16, wherein said lanthanoid-based metal oxide is lanthanum oxide, cerium oxide, samarium oxide, gadolinium oxide, dysprosium oxide, erbium oxide or holmium oxide.

18. A method of producing the semi-transmitting and semi-reflecting electrode substrate according to any one of Claims 10 to 13, the method comprising:

a step of etching the above transparent conductive layer which contains indium oxide as its major component and further one or two or more oxides selected from

lanthanoid-based metal oxides and is disposed on said transparent substrate, by an etchant containing oxalic acid; and

a step of etching the metal layer connected electrically with said transparent electrode layer by a mixture acid containing phosphoric acid, acetic acid and nitric acid to form said metal reflecting layer.

19. A method of producing the semi-transmitting and semi-reflecting electrode substrate according to any one of Claims 14 to 17, the method comprising:

a step of etching said transparent conductive layer which contains indium oxide as its major component and further containing one or two or more oxides selected from lanthanoid-based metal oxides and is disposed on said transparent substrate, by an etchant containing oxalic acid; and

a step of etching the metal layer having a reflectance of 80% or more which connects said transparent electrode layer electrically with a TFT element, by a mixture acid containing phosphoric acid, acetic acid and nitric acid.

20. The method of producing a semi-transmitting and semi-reflecting electrode substrate according to Claim 18 or 19, wherein said lanthanoid-based metal oxide is lanthanum oxide, cerium oxide, samarium oxide, gadolinium oxide, dysprosium oxide, erbium oxide or holmium oxide.

21. A liquid crystal display device comprising:

the semi-transmitting and semi-reflecting electrode substrate according to any one of Claims 10 to 17; and

a liquid crystal layer driven by said semi-transmitting and semi-reflecting electrode substrate.